

I. Executive Summary/ Overview

A. The 305(b) Process

Section 305(b) of the Federal Clean Water Act (CWA) requires each state to assess the health of their surface waters and submit biennial reports describing the water quality conditions to the USEPA. This 305(b) process is the principal means by which states, EPA, and the public evaluate water quality, the progress made in maintaining and restoring water quality, and the extent to which problems remain. Currently, EPA and the states are outlining a new format of reporting on the status of water quality. In 2004, an new Integrated Report, which combines the 305(b) assessment process with the 303(d) impaired waters listing process, will be the method by which RIDEM will present the status of the States' water quality.

B. Water Quality Assessments

Section 305(b) of the CWA requires that states assess their water quality for attainment of the fishable and swimmable goals of the CWA. The state is to measure attainment of the CWA goals by determining how well the waters support their designated uses. For the purpose of this report, assessments are made on the following individual designated uses: aquatic life, swimming, drinking water, fish consumption and shellfishing. The recent data used to generate the information for this 2002 report are generally from 1999 and 2000, however, some data collected during 2001 were available in time for incorporation as well.

Waterbodies, or segment of waterbodies, are evaluated to determine the level of use support attainment by comparing water quality data with the appropriate criteria for each designated use. One of the following four levels of use support attainment is assigned to the waterbody or water segment: fully supporting, fully supporting but threatened, partially

supporting, or not supporting. Due to a potential terminology conflict associated with the application of the fully supporting but threatened category, this category was only applied to the assessment for one waterbody, a drinking water reservoir, at the request of the Department of Health. Assessments to determine use support can be either "monitored assessments" based on recent monitoring data or "evaluated assessments" based on qualitative information or monitoring information which is more than 5 years old. In situations where the water quality information is more than 10 years old, the waterbody is generally considered not assessed.

In the assessments, the pollutants and other stressors (causes) that contribute to the actual or threatened impairment of designated uses in a waterbody or waterbody segment are listed if information allows. In addition, the sources, or activities, facilities, or conditions that contribute, or may contribute pollutants or stressors resulting in impairment of designated uses in a waterbody, are also listed if information is available. In general, the actual sources of impairment are not determined until a TMDL (Total Maximum Daily Load) is conducted on the waterbody. As such, most of the sources noted in this report are just potential sources. Common causes of non-support include metals, pathogens and nutrients. Potential major sources include municipal and industrial discharges, CSOs, and nonpoint sources such as stormwater runoff and failed septic systems.

Please note that refinements in the state's total waters and individual waterbody size estimates continued with this report. More accurate RIGIS estimates at a scale of 1:24,000 have been incorporated into the 2002 assessment database and report. In addition, more waterbodies (lakes and rivers) have been added to the assessment database. These refinements which changed the individual waterbody sizes, may significantly alter the various percentiles calculated in this report relative to previous reports. In other words, differences in percentiles between reports may simply be a factor of updated waterbody size estimates and not necessarily due to

changes in monitoring effort, water pollution or other similar water quality reasons. Estimating trends is therefore, difficult to conduct at this time.

As noted in Section III.C., the methodology utilized for determination of use support status has been slightly modified for this report. Much data used in previous assessments is now more than ten years old or was originally only based on Best Professional Judgement (BPJ). Some of these areas are considered "not assessed" for this report. This will give a more accurate representation of the waters in the state for which we have data and the areas where monitoring is needed. In addition, a process of extrapolating an assessment from a monitored site to an upstream or downstream site, as appropriate, was more fully initiated with this report. This may have led to considering several previously "not assessed" sites to now assessed but with evaluated data.

C. River Assessments

Approximately 36% (532 miles) of the 1,498 river miles (total river miles at 1:24,000 scale) in Rhode Island have been assessed for this report. The majority of unassessed river miles in general include the many small headwater streams and rivers of the state. Of the river miles assessed (532 miles), 74% (392 miles) are considered monitored while 26% (140 miles) are considered evaluated.

Approximately 66% (348 miles) of the state's rivers and streams assessed, fully support all of their designated uses. Approximately 34.5% (184 miles) of the river miles assessed are considered impaired for one or more uses.

Data was available to assess 419 river miles for swimming use support. The data showed that 72% (302.5 miles) fully support the swimming use, and approximately 28% (116 miles) are considered impaired for swimming use. Data was available to assess 506 river miles for aquatic

life use support. The data showed that 74% (376 miles) of the river miles assessed fully support aquatic life needs. Just over 26% (130.5 miles) are considered impaired for aquatic life uses.

Data was available to assess 7.72 river miles for fish consumption use support. This represents the portion of the Woonasquatucket River from below Smithfield to the confluence with the Moshassuck River where the RIDOH has issued a no fish consumption advisory. This 7.72 river miles is considered impaired for fish consumption use.

The most significant causes of non-support for rivers and streams are biodiversity impacts, pathogens, heavy metals (especially Cu and Pb), and nutrients. In the majority of cases there is not enough data to link the causes of non-support to actual sources of the pollutant. Potential sources of non-support are, however, noted to include point sources (CSOs, municipal and industrial discharges), nonpoint sources (urban runoff/storm sewers, septic systems), and natural sources (wildlife and waterfowl).

Fifty-two (52) rivers reviewed for this report are located within Drinking Water Supply systems. These 52 rivers represent 113 river miles. Almost all of these rivers are considered unassessed for drinking water use. This is because the Department of Health only requires water quality data, to evaluate the source water, to be collected from the terminal reservoir of the system. The terminal reservoir is the location of the intake pumps. In general, sampling conducted elsewhere in the system has been determined by the DOH to be too limited in scope to use in conducting a drinking water use assessment. The 4.04 river miles assessed, fully support the drinking water use.

D. Lake Assessments

Seventy-nine percent (16,581 acres) of the 20,917 acres of lakes in Rhode Island have been assessed for this report. Of the lakes assessed, approximately 67% (11,169.75 acres) are considered monitored and approximately 33% (5,410.76 acres) are considered evaluated.

Approximately 78% (12,931 acres) of lake acres assessed fully support all designated uses and less than 1% (<5 acres) assessed fully support all designated uses but are considered threatened. Approximately 22% of lake acres assessed (3,645 acres) do not support their uses and are considered impaired for one or more uses.

Data was available to assess 14,561 lake acres for swimming use support. The data indicated that most lake acres fully support their swimming use (95%, 13,846 lake acres). Approximately 5% (715 acres) of lake acres assessed are considered impaired for the swimming use.

Data was available to assess 15,501.24 lake acres for aquatic life use support. Approximately 80% of the lake acres assessed (12,402 acres) fully support aquatic life needs. Approximately 20% (3,099 acres) of lake acres assessed are impaired for aquatic life uses.

The RI Department of Health has issued an advisory against eating fish from four ponds in the state. These four ponds total approximately 503 acres.

Forty-two (42) lakes assessed are used as drinking water supply sources. This represents 7,813 acres associated with the drinking water supply systems. Of these 7,813 acres, 5,484 acres (70%) are considered assessed for drinking water use for this report. The remaining 2,329 lake acres, or 30% were considered not assessed for drinking water use support. In general these 2,329 acres represent portions of the drinking water supply system that are upstream of the terminal reservoir. The terminal reservoir is the location within the drinking water supply system where the Department of Health requires the water samples to be collected. Some of

these upstream waters are not monitored or have only limited monitoring and are, therefore, considered unassessed for drinking water use in this report. Ninety-nine percent (5,424 acres) of the drinking water supply lake acres assessed were found to be fully supporting, and less than 1% (<5 acres) of the lake acres assessed fully support drinking water uses but are threatened. Approximately 1% (55 acres) of drinking water supply lake acres assessed are considered impaired for the drinking water use.

For lakes and ponds, the major causes of non-support are high bacteria and nutrient levels and low dissolved oxygen. Another major cause of non-support in terms of total acreage effected, is from metals. Major sources of non-support in lakes and ponds are mainly from nonpoint source impacts such as urban and stormwater runoff. Agriculture, septic systems and flow modification are suspected sources of non-support in lakes.

Trophic classifications are provided for 169 lakes, covering a surface area of 17,815 acres. Of these, 87 are publicly-owned lakes/ponds which cover a surface area of 8,713 acres. Three publicly-owned lakes are classified as hypereutrophic, ten lakes are classified as eutrophic, 32 are considered to be within the mesotrophic range and 17 are considered to be oligotrophic. The rest of the public lakes (5) fall between several trophic classifications. These classifications are based on recent (1999 & 2000) Watershed Watch volunteer monitoring data.

E. Estuarine and Coastal Shoreline Assessments

All of the 156.29 square miles of estuarine waters were reviewed for this report. Over 99% (156.23 square miles) of the estuarine waters have enough data to be considered assessed for this report. Of those assessed areas, 99% (154.42 square miles) are considered monitored and approximately 1% (1.8 square miles) are considered evaluated. It is important to note that the large percent of estuarine waters considered assessed (99%, 154.42 square miles) are, to a large

degree, only monitored for pathogens by the RIDEM Shellfish Monitoring Program. Therefore, the majority of Rhode Island's estuarine waters have current monitoring data for pathogens to assess for swimming and shellfishing use support status. Recent dissolved oxygen surveys have been conducted throughout the Bay. While the data is limited it has been used to assess for aquatic life use support status.

Just over 69% (108.6 square miles) of the estuarine waters assessed fully support *all* uses. Approximately 30% (47.64 square miles) of the estuarine waters assessed are considered impaired for one or more uses.

Data was available to assess 155.75 square miles of estuarine waters for swimming use. Most estuarine waters assessed support their swimming uses (94%, 145.83 square miles). Approximately 6% (9.92 square miles) of the estuarine waters assessed are considered impaired for the swimming use due to violations of fecal coliform criteria.

Data was available to assess 116.41 square miles of estuarine waters for aquatic life use. The majority of estuarine waters assessed fully support aquatic life needs (64%, 74.52 square miles). Approximately 36% (42 square miles) are impaired for aquatic life uses.

The estuarine waters classified as SA and SA{b} are designated for shellfishing uses. Excluding Rhode Island Sound and Block Island Sound, this represents approximately 132.66 square miles. Data was available to assess 131.35 square miles of SA and SA{b} waters for their shellfishing use support status. The majority of class SA and SA{b} waters (79%, 104.19 square miles) fully support the shellfishing use. Partial support of the shellfishing use occurs in approximately 16% (21.39 square miles) of the estuarine waters. In general, this 21.39 square miles encompasses areas with a seasonal or conditional shellfish closure associated with it. Approximately 5% (5.77 square miles) of the Class SA and SA{b} estuarine waters are permanently closed to shellfishing and are considered not supporting the shellfishing use.

The major impacts on designated uses for the estuarine waters of Rhode Island are due to bacterial contamination, low dissolved oxygen and nutrient enrichment. The major sources of bacterial contamination are due to combined sewer overflows (CSOs). CSOs, urban runoff and point source discharges are sources of the nutrient enrichment and low dissolved oxygen problem in the Upper Bay and coves. This water quality problem, while not fully characterized, indicates that nutrients are linked to adverse impacts of reduced dissolved oxygen levels.

Rhode Island has 78.62 coastal shoreline miles. The coastal shoreline is defined as a line along the coast from Westerly to Point Judith, up to the mouth of the Narragansett (Pettaquamscutt) River, across to Beavertail on Jamestown, across to Brenton Point in Newport and along the Newport coast to Sachuest Point, across to Sakonnet Point in Little Compton and along the coast in Little Compton to the Rhode Island/Massachusetts border. Bacteria data was available to assess the entire coastal shoreline for swimming and shellfishing use support status. All 78.62 miles were assessed as fully supporting both swimming and shellfishing uses.

F. Wetlands

Freshwater and coastal wetlands encompass approximately 18.4% of Rhode Island's landscape (127,721 acres). There are approximately 111,893 acres of freshwater and 15,828 acres of estuarine and marine wetland and deepwater habitats in the State, excluding the waters of the Narragansett Bay and the Pawcatuck River estuary (RIGIS 1988). Rhode Island's wetlands have been regulated and protected by state and federal statutes for nearly 30 years. The U.S. Army Corps of Engineers, with the assistance of the other federal resource protection agencies, namely, the U.S. Environmental Protection

Agency, the U.S. Fish and Wildlife Service and the National Marine Fisheries Service, implement Section 404 of the Clean Water Act (33 U.S.C. 1341 and 1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403). Since 1971, the Department of Environmental Management (DEM) has implemented the Rhode Island Freshwater Wetlands Act (R.I.G.L. 2-1-18 et seq.), and the Coastal Resources Management Council has been the designated agency for implementation of the federal Coastal Zone Management Act. DEM also implements Section 401 of the federal Clean Water Act. These statutes and accompanying regulations consistently require that applicants avoid and minimize alteration of freshwater and coastal wetlands.

Rhode Island does not have statewide data on historic freshwater or coastal wetland loss. Historic losses can be attributed predominantly to urbanization, transportation projects and residential development. Data generated by DEM since 1998 indicates that the extent of permitted freshwater wetland loss is kept to a minimum through DEM's wetland regulatory programs. Federal, state, and local partners have recently teamed to develop proactive wetland and habitat restoration plans and projects.

The State of Rhode Island and federal and local partners are collaborating on other proactive wetland protection initiatives: coastal wetland inventory, wetland acquisition planning, vernal pool identification and protection, and data and mapping improvements. Rhode Island does currently monitor the ecological health of wetlands but does participate on the New England Wetland Bioassessment Work Group.

G. Plan for Achieving Comprehensive Assessments

The Department of Environmental Management's Office of Water Resources (OWR) has committed to the development of a watershed approach that will guide OWR

with respect to future work toward surface water pollution abatement. However, an OWR assessment of state water resource protection programs identified gaps in baseline monitoring, inadequate data management and assessment programs as significant deficiencies which jeopardize the integrity of the watershed-based approach and achievement of comprehensive assessments. Recognizing inadequate data management as an inefficiency and obstacle to improved performance, reporting capabilities and comprehensive assessments, OWR has completed a number of key steps to improve data management and thus facilitate the comprehensive assessment goals. These data management improvements have substantially facilitated the 305(b) assessment process and allowed for easier identification of ambient monitoring gaps and improved assessment and mapping capabilities. In working towards Comprehensive Assessment of the State's waters, OWR is committed to the process of developing a state-wide monitoring strategy. It is anticipated that the strategy will be drafted to include targeted and probability-based monitoring designs to address the data gaps and comprehensive monitoring goals.

H. Water Pollution Control Program

From 2000-2002, the Rhode Island Watershed Approach partners continued to work on regional and ecosystem-based solutions to issues that cross boundaries, such as restoring water quality, remediating contaminated sites and preserving significant landscapes. RIDEM's new Sustainable Watersheds Office plays a key role in the partnership by providing a watershed coordinator for the South County Watersheds and the Northern Region. These coordinators are helping to prepare Watershed Action Plans and are helping to form broad partnerships with DEM personnel, other state and federal

agencies, municipalities, non-profit organizations, and residents to target resources toward implementing watershed-specific action items.

The Standards Section of the Office of Water Resources (OWR) implements the state's Water Quality Standards Program. The Water Quality Standards Program is responsible for ensuring compliance with the Federal Clean Water Act (CWA). The purpose of this program is to restore, preserve, and enhance the water quality of Rhode Island waters, to maintain existing uses and to protect the waters from pollutants so that the waters shall, where possible, be fishable and swimmable, and be available for all designated uses and thus assure protection for the public health welfare, and the environment. These objectives are implemented through the water quality standards which are a fundamental element of the state's Water Quality Regulations. The water quality standards are developed to define water quality goals for the state's waters by deciding what their uses will be (designated uses) and by setting criteria necessary to protect those uses. In addition to establishing water quality goals for state waters, surface water quality standards also serve as the regulatory basis for the establishment of water-quality-based treatment controls and strategies beyond technology-based controls.

The OWR is delegated to administer the National Pollutant Discharge Elimination System (NPDES) program which is implemented by the OWR as the Rhode Island Pollutant Discharge Elimination System, known as the RIPDES Program. This is the backbone of the state's water pollution control strategy, which includes developing and enforcing permit limitations for municipal and industrial wastewaters, stormwater, and combined sewer overflows discharged directly to the waters of the state (RIPDES Program) as well as industrial wastewaters discharged to municipally-owned treatment facilities (the Pretreatment Program). The RIPDES program currently oversees permit

development and compliance for 19 major municipal and 6 major industrial discharges in addition to over 100 minor discharges. The Pretreatment Program is necessary to prevent industrial discharges from interfering with the operation of municipal wastewater treatment facilities and/or causing the facility to violate its discharge limits. OWR provides oversight of 15 approved local pretreatment programs administered by publicly owned wastewater treatment facilities. The OWR administers the Water Quality Certification Program, required by Section 401 of the Clean Water Act. This program ensures that certain types of projects do not adversely impact the quality of the state's water resources.

The Operation and Maintenance Section within the OWR conducts operation and maintenance inspections and compliance evaluations at all major and minor municipal facilities to ensure conformance with permit requirements. The Operation and Maintenance staff also issue Orders of Approval for operation and maintenance manuals and review operation failures that result in permit violations. Review and approvals of wastewater facility plans, engineering reports and engineering plans and specifications for WWTF improvements, sanitary sewer systems and marine sewage pumpout facilities are conducted by the OWR staff. The Operation and Maintenance Section is also responsible for issuing approvals for the disposal, utilization, and transportation of wastewater sludge and performing inspections to ensure that the sludge is being managed in the manner approved.

The Financial Assistance Program within the OWR consists of administering and/or assisting in the oversight of financial assistance programs aimed at assisting communities and others in achieving water quality protection goals. This program encompasses a number of financial assistance programs for the construction upgrade of

wastewater collection systems and treatment facilities, including the State Revolving Loan Program, Non-Governmental Bond Fund Program, the Interceptor Bond Program and the Pawtuxet River Water Quality Bond Fund Program. The OWR also provides technical assistance and general support for the Rhode Island Aqua Fund Program.

I. Nonpoint Source Pollution Management Program

The RIDEM's Nonpoint Source Pollution Management Program was established in accordance with Section 319 of the Water Quality Act of 1987. This non-regulatory program was previously administered by the Department's Office of Environmental Coordination. Pursuant to the Department's reorganization in 1996, the Nonpoint Source Program was integrated into the Watershed Approach and is now administered by the OWR. This Program implements the Nonpoint Source Management Plan with the goals of mitigating existing and preventing subsequent nonpoint source pollution.

The Program is involved in a number of activities. In particular, over the past year key activities have included: (1) Septic System Maintenance Policy Forum; (2) Storm Water Management and Integration with RIPDES Phase II; (3) support of TMDLs; (4) support of improved land management and (5) solicitation of community projects through a competitive granting process.

In 1999, for the first time in several years, the NPS program issued a competitive solicitation for grant proposals using incremental 319(h) funding (i.e., Clean Water Action Plan funding). This process has been repeated in each year since then.

J. Cost/Benefit Assessment

A true cost/benefit assessment for the OWR is, at best, difficult to obtain. This is due to the complexities involved in evaluating the economic value of incremental improvements in water quality. Efforts have been made to compare the biennial 305(b) water quality assessments in an attempt to determine changes and/or trends in water quality over time. However, this has been unsuccessful due to changes in the evaluation protocols and the lack of a direct correlation between water quality improvements, environmental/natural resource improvements, and the associated economic impacts and valuations of these improvements. Nonetheless, some estimates of the costs and benefits of improvements in water quality and water resources are available from projects conducted under and funded by the Construction Grants Program.

Benefits from improvements in water quality and water resources can be inferred from a recent state Travel and Tourism Research Report (Volume 18, Number 1, May 2001) generated by the University of Rhode Island for the Department of Economic Development. This report indicated that the number of visitors to Rhode Island in recent years increased at a rate that is nearly double the national average. Narragansett Bay's public beaches host nearly 4 million visitors throughout an average year, while its waters support more than a million recreational fishing trips. The RI travel and tourism revenue broke the three billion-dollar mark, at a preliminary estimate of \$3.26 billion in 2000. The report further noted that the number of tourism-related businesses and jobs have increased as well. In 2000, an estimate 5,440 businesses contributed to an estimated 38,900 jobs and approximately \$669 million in wages.

K. Water Quality Monitoring Programs

The Office of Water Resources' (OWR) surface water monitoring program is designed to gather state-wide baseline data in addition to targeted monitoring information. The data is used in establishing and reviewing the state's water quality standards, to measure progress toward achieving the state and federal water quality goals, and to supply information for use in development of permit limits for wastewater discharges and total maximum daily loads (TMDLs). Current surface water monitoring programs include activities conducted by the OWR staff as well as monitoring carried out by other agencies/organizations under contracts with OWR. The surface water monitoring program consists of targeted and probability based station sites, intensive surveys, special studies, and volunteer monitoring programs. The Shellfish Growing Area Monitoring Program collects samples from 17 separate shellfish growing areas and analyzes for fecal coliform. Shoreline surveys are conducted to determine shellfish classification for the growing areas and to locate potential and actual bacterial sources. OWR has contracted with the USGS to conduct riverine monitoring at 7 stations in Rhode Island. Biological monitoring, utilizing artificial substrates is conducted at 6 river stations in close proximity to the USGS fixed river stations. The USEPA Rapid Bioassessment Protocols are followed for macroinvertebrate sampling at 45 stream sites around the state. Twenty-five of these 45 stations are also monitored for various conventional and toxic pollutants. The OWR is involved in watershed monitoring projects on over 30 waterbodies. These projects are in accordance with the Department's initiation of a Watershed Approach and total maximum daily load (TMDL) development. Surface water monitoring activities are also conducted by many Citizens Monitoring

groups. These groups supply the OWR with supplemental water quality data for numerous rivers, lakes, ponds and estuarine waters of the state.

L. Public Health/Aquatic Life Concerns

Fish consumption advisories are in effect for all fish from the Woonasquatucket River below Smithfield due to dioxin, PCB and mercury contamination, and for bass from the Quidnick Reservoir due to mercury contamination. The Department of Health has also issued an advisory to limit the consumption of saltwater striped bass and bluefish and swordfish and shark to one meal per month.

During 2000 and 2001, 10 fish kill events occurred in Rhode Island waters, however none of these events were definitively linked to toxic pollutants. Low dissolved oxygen was determined to be the most predominant cause of these fish kills.

National sediment criteria have not yet been established and there are no numerical sediment criteria in Rhode Island's Water Quality Regulations. Consequently, sediments are not routinely sampled as part of the state's ambient monitoring program. Sediments are evaluated under two programs in OWR: dredging and disposal, and ecological risk assessments. Both of these areas of sediment assessment are addressed in relation to programs carried out by the RIDEM Office of Waste Management.

In May 2000 there was an improvement in the shellfish harvesting status for 43 acres and no new restrictions were imposed. In May 2001 there was an improvement in the shellfish harvesting status for 19 acres and new restrictions were imposed on 80 acres. In 1999, Conditional Area A was closed for 224 days and Conditional Area B was closed for 99 days; Greenwich Bay was closed for 166 days and Mt. Hope/Kickamuit were closed for 192.5 days. In 2000, Conditional Area A was closed for 229 days and

Conditional Area B was closed for 124 days; Greenwich Bay was closed for 164 days and Mt. Hope/Kickamuit were closed for 169 days.

No bathing beaches were closed in Rhode Island during 2000 and 2001 due to toxic impacts. Ten beaches were closed in 2000 and twelve beaches were closed in 2001 due to elevated levels of fecal coliform. Some of the causes of the high fecal coliform counts were related to large populations of shorebirds and Combined Sewer Overflows. There were no closures of surface drinking waters during 1999 and 2000 due to water quality problems in the surface water supply.

M. Groundwater

Groundwater is a locally abundant and widely used resource in Rhode Island. Approximately 26% of the state's population is supplied with drinking water from public and private wells (Solley et al 1998). Groundwater resources are expected to meet a substantial part of the state's future water supply needs. Groundwater quality in most parts of the state is suitable for human consumption and other uses without treatment. Furthermore, protection of groundwater quality is important to protect surface water quality, since during dry periods, water in streams is derived almost entirely from groundwater.

Rhode Island's groundwater resources are extremely vulnerable to contamination because of the generally shallow depth to groundwater, aquifer permeability, and the absence of any subsurface confining layers. Preventing groundwater pollution must be a priority if the long-term quality of the State's groundwater resources is to be protected.

Over 100 different contaminants have been detected in Rhode Island groundwater, with the most common being petroleum products, organic solvents, nitrate

and historically the pesticide aldicarb (Temik). Contaminant sources include leaking underground fuel storage tanks, hazardous and industrial waste disposal sites, illegal or improper waste disposal, chemical and oil spills, landfills, septic systems, road salt storage and application practices, and fertilizer and pesticide applications. Most groundwater contamination problems occur on a localized basis originating from a specific source. No public wells serving community systems or non-transient non-community systems were discontinued from service due to pollution from human activities during this reporting period (July 1995 – June 1999).

The Department of Environmental Management (DEM) is continuing to implement and refine a comprehensive groundwater protection program in response to legislative mandates and in response to the need to prevent further degradation of the state's valuable groundwater resources.

Below are the key findings of the 2000 review of groundwater quality in Rhode Island:

- * Groundwater remains an important component of the total volume of freshwater used in Rhode Island. The US Geological Survey estimates that 27 million gallons per day of groundwater were withdrawn in 1995. This constitutes 20% of the total freshwater used in the state. Approximately 26% of the state's population obtains its drinking water from groundwater sources.

- * Groundwater in Rhode Island is generally free of pollutants, and in over 90% of the state it is considered suitable for drinking water use and other uses without treatment. No public wells serving community systems or non-transient non-community systems were discontinued from service during this reporting period (July 1995 – June 1999) due to pollution from human activities.

* The most frequently detected contaminants in public wells in RI, excluding compounds which are naturally occurring, are MTBE, a gasoline additive, and the widely used chemical solvents (e.g., trichloroethene, trichloroethane and tetrachloroethane). Nitrate is also a concern as it is often detected at concentrations far above natural background levels.

* A review of water quality data from community and non-transient non-community public wells indicates the vast majority of wells withdraw from a clean groundwater resource. On an annual basis, 87% to 89% of the wells had nitrate concentrations less than 3 mg/l, with five wells slightly exceeding the standard of 10 ppm. The annual percentage of wells with sodium levels less than 20 mg/l was 79%, and only three wells exceeded the advisory of 100 mg/l. Metals and pesticides were not detected in groundwater in concentrations that were of concern.

* Public well data does indicate that groundwater resources are vulnerable to contamination by volatile organic compounds (VOCs). Between 15% and 30% of the wells tested during this reporting period detected VOCs. However, only two non-transient non-community water supply wells were found to be above a drinking water standard.

* The leading cause of new groundwater contamination incidents reported to DEM continues to be the release of petroleum products stored in underground storage tanks.

N. Special State Concerns

Over the past ten years, the focus of state water pollution concerns has gradually shifted from specific discharges or "point" sources to the diversity of pollution sources

categorized as "non-point" sources. Following a public investment of over \$284 million in federal funds and over \$64 million in state funds for construction of wastewater treatment systems, the majority of the larger direct dischargers into Rhode Island waters, which are municipal wastewater plants, are now operating reliably with respect to conventional treatment. Well established programs to regulate direct discharges and industrial pretreatment have been generally effective in controlling and often reducing toxic pollutant loadings to surface waters. Continued vigilance and effective enforcement within these programs is needed to ensure the long-term protection of water quality.

While wastewater treatment has significantly improved over the past decade, water quality degradation due to combined sewer overflows (CSOs) remains a longstanding major concern. CSOs continue to cause bacterial contamination of the Upper Narragansett Bay. In addition, DEM has more recently determined that both CSOs and treated discharges are contributing to a nutrient enrichment problem in the Upper Bay. This water quality problem, while not fully characterized, indicates that nutrients are linked to adverse impacts of reduced dissolved oxygen levels.

In addition to controlling point sources of pollution, it is now recognized that maintaining or restoring state waters to their desired condition (fishable, swimmable or drinkable, as appropriate) requires that non-point sources of pollution be addressed. Data available to date indicate that the most serious non-point pollution concerns with respect to surface water appear to be septic systems, stormwater discharges and erosion. These sources have adversely affected both the coastal ponds region, other coastal embayments and inland freshwater lakes and ponds, including drinking water reservoirs. The pollutants of concern are bacteria, nutrients and sediments, respectively. Among nonpoint sources, addressing septic system concerns continues to be a priority. DEM has

instituted a number of reforms to the regulatory process including soil-based siting, licensing of designers and process for approving specific innovative and alternative technologies. Additionally, DEM is actively supporting the development of local wastewater management programs which serve a vital role in promoting proper maintenance of ISDSs.

To promote restoration of water quality, DEM has initiated projects, known as Total Maximum Daily Loads (TMDLs) which characterize water pollution problems and recommend abatement action in targeted watersheds. This important new initiative involves local stakeholders throughout the process. DEM is giving priority in the distribution of 319 grants to TMDL implementation projects.

On an agency-wide basis, DEM is also promoting watershed-based approaches to resource protection and management. The goal of working on a watershed basis is to foster greater collaboration and coordination among all stakeholders to enhance protection or restoration efforts. The approach is currently being piloted in two areas.

An additional state concern is the lack of water quality data for portions of the state's waters. DEM is committed to the development a comprehensive monitoring plan which will recommend actions to eliminate data gaps. Additional resources will be needed to support a comprehensive baseline monitoring program.